2462

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Service Manual

ORDER NO.
ARP1736

STEREO TURNTABLE

PL-445 Original

PL-445-S

- This manusl is applicable to the PL-445/WEM and PL- 445-S/WEM types.
- PL-445-S is Silver versions of PL-445.
- Ce manual pour le servise comprend les explications en français de réglage.
- Este manual de servicio trata del método ajuste escrito en español.

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1. SPECIFICATIONS

PHONOGRAPH MOTOR AND PLATTER

Motor type ..... Quartz PLL Hall motor
Drive system ..... Direct drive system
Speed of rotation ..... 2 speeds: 33-1/3, 45 rpm
Wow and Flutter ..... Less than* 0.012% (WRMS)
0.025% (WRMS)
±0.035% WTD Peak (DIN)

Values marked with an "" designate the wow and flutter for the motor, and do not include the cartridge or tonearm load.*

S/N ratio ..... More than 78 dB (DIN-B)
Platter ..... Diameter ø304 mm, aluminium die-cast

TONE ARM

Type ..... Static balance straight pipe arm
Usable cartridge weight ..... 3 g (min.) to 8 g (max.)

SUPPLIED CRATRIDGE

Type ..... MM type
Replacement stylus PN-260
Stylus ..... 0.6 mil diamond
Output voltage ..... 2.5 mV (1 kHz, 5 cm/s, LAT Peak)
Suitable stylus pressure ..... 1.5 – 2.5 g(Optimum value 2.0 g)
Frequency response ..... 10 Hz – 30,000 Hz
Head shell type ..... Universal type
Cartridge weight ..... 5.7 g
Load resistance ..... 47 kΩ

POWER SUPPLY, OTHERS

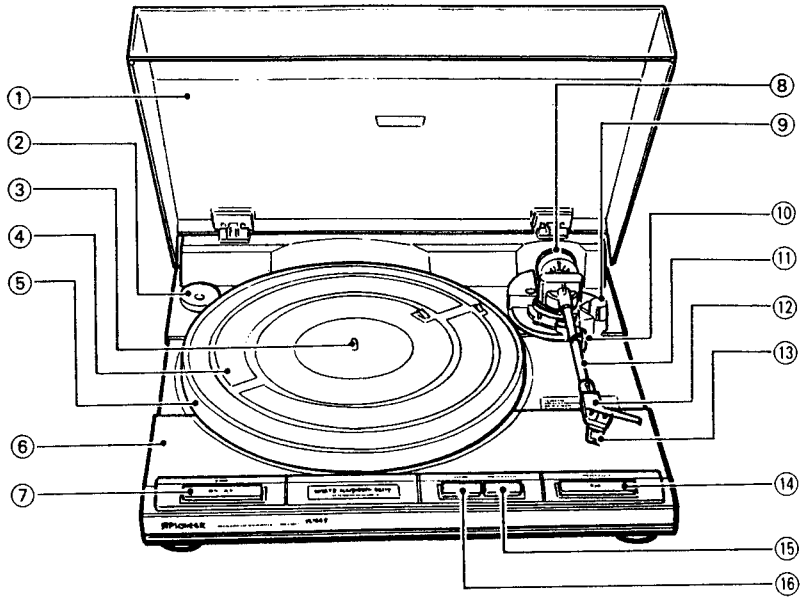
Power requirements ..... a.c. 220 – 240 Volts ~, 50/60 Hz
Power consumption ..... 11 W
External dimensions ..... 420 (W) x 118 (H) x 366 (D) mm
16-9/16 (W) x 4-5/8 (H) x 14-3/8 (D) in
Netweight ..... 5.4 kg (11 lb 14 oz)

SUPPLIED ACCESSORIES

EP adaptor 1
Operating instructions 1

NOTE:
Specifications and design subject to possible modification without notice, due to improvements.

2. PANAL FACILITIES



① **Dust cover**

② **EP adaptor**
Place over spindle to play 45 rpm singles.

③ **Spindle**

④ **Platter mat**

⑤ **Platter**

⑥ **Cabinet**

⑦ **SPEED selector (33/45)**
Set to 45 for 45 rpm records.
Set to 33 for 33-1/3 rpm records.

⑧ **Counterweight**

⑨ **Antiskating control**

⑩ **Armrest**

⑪ **Tonearm**

⑫ **Headshell**

⑬ **Cartridge/Stylus**

⑭ **PLAY/STOP button (▶ / ■)**
Press to start automatic play and to stop play.

⑮ **ARM-ELEVATION control (▼ / ▼)**
Moves tonearm up and down.

⑯ **REPEAT button (↻)**
The disc will be played repeatedly if this button is in the depressed position. Press again to cancel repeat play.

3. EXPLODED VIEWS AND PARTS LIST

3.1 EXTERIOR

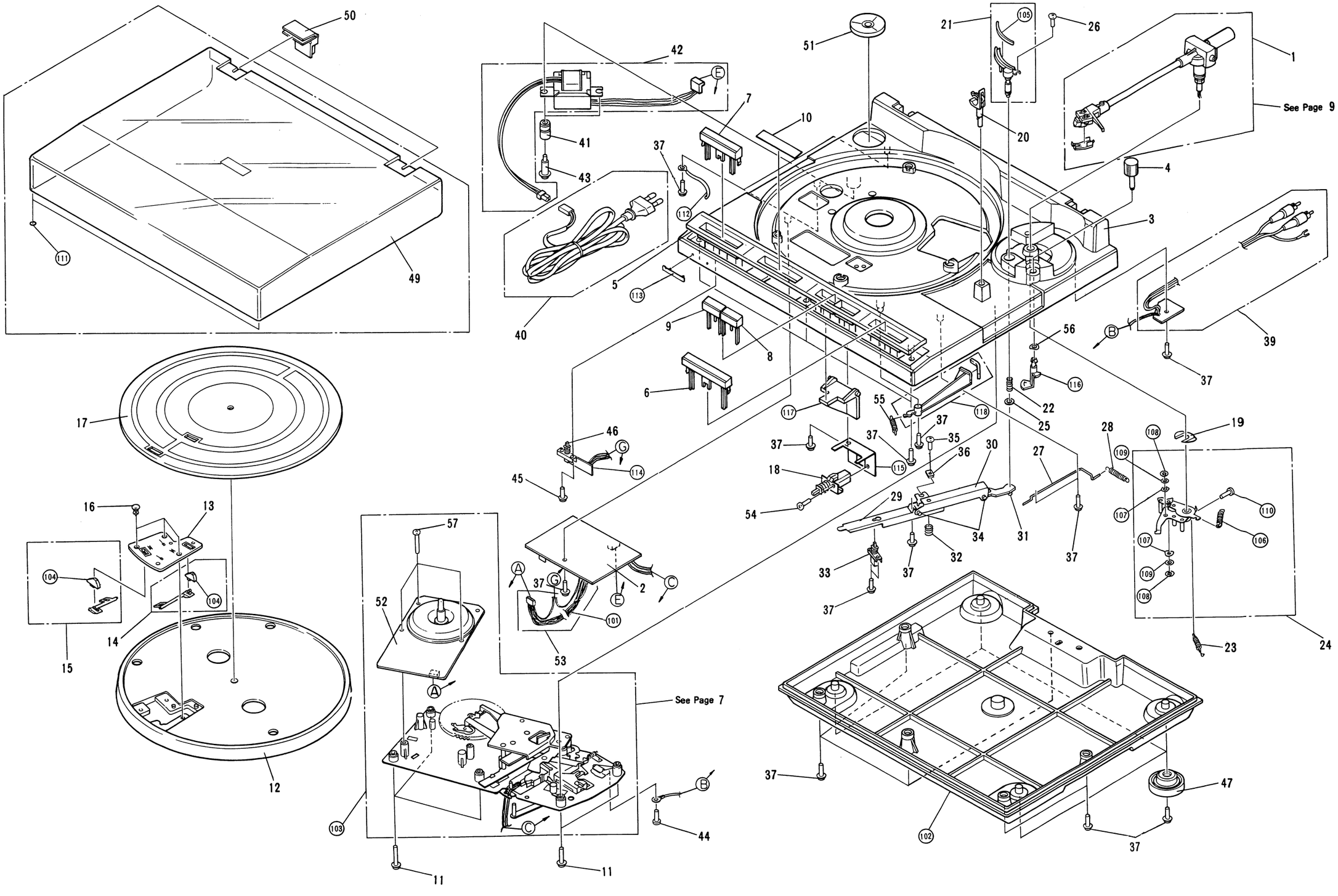
NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

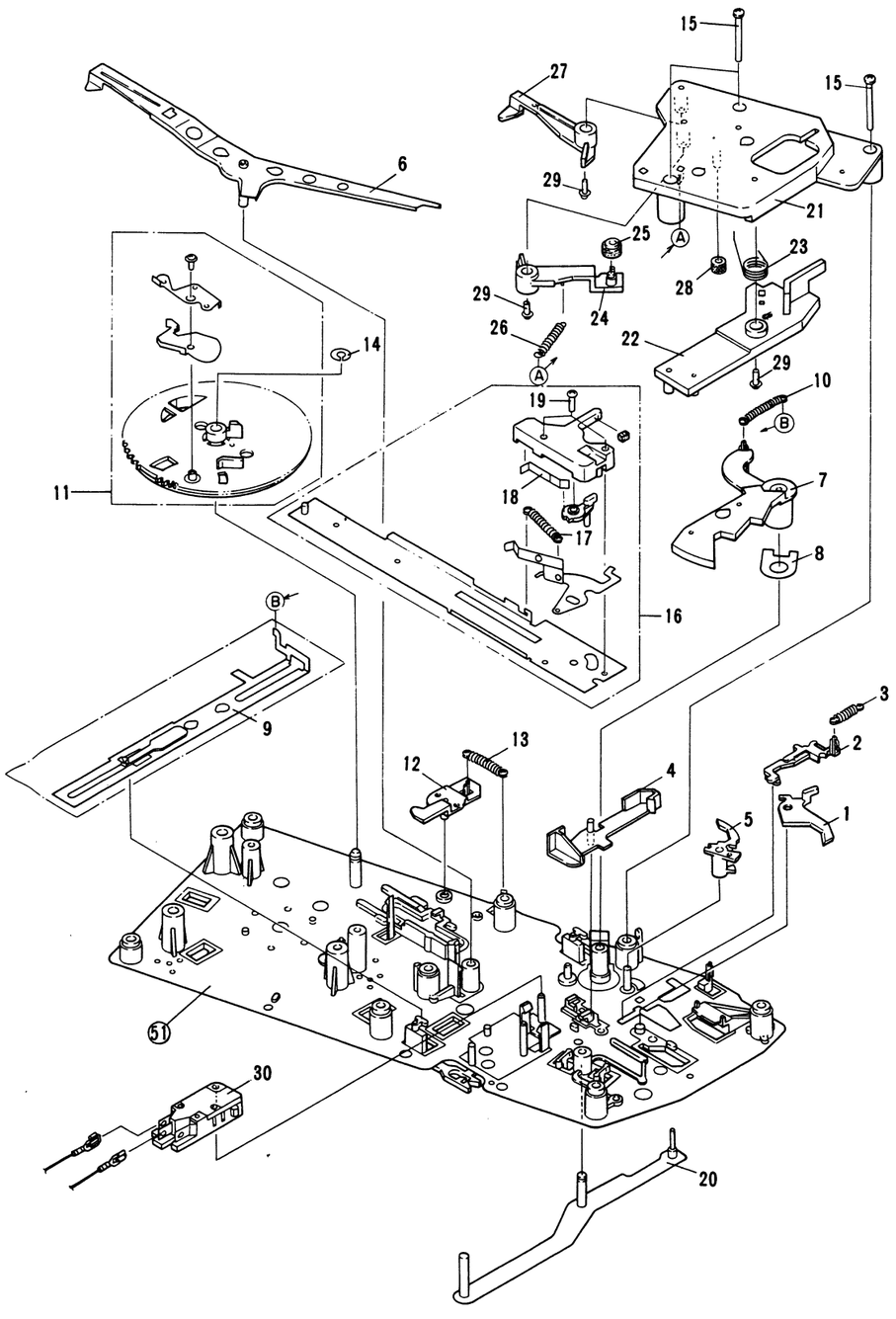
Parts List of Exterior

Mark	No.	Parts No.	Description
	1	PPD1024	Arm assembly
⚠	2	PWR-084	Power supply P.C.board assembly
	3	PNW1513	Panel (BLACK)
		PNW1514	Panel (SILVER)
	4	PAC1369	As knob
	5	PAM1284	Front plate (BLACK)
		PAM1285	Front plate (SILVER)
	6	PAD1041	S/S button unit (BLACK)
		PAD1042	S/S button unit (SILVER)
	7	PAD1047	SP button unit (BLACK)
		PAD1048	SP button unit (SILVER)
	8	PAD1043	EV button unit (BLACK)
		PAD1044	EV button unit (SILVER)
	9	PAD1045	RE button unit (BLACK)
		PAD1046	RE button unit (SILVER)
	10	PAN1124	Plate (BLACK)
		PAN1125	Plate (SILVER)
	11	IPC30P290FMC	Scrwe (3 × 29)
	12	PNR-219	Turntable platter
	13	PNY-059	Hook holder
	14	PXV-037	Record detector unit
	15	PXV-038	Size detector unit
	16	PBM-011	Plastic rivet
	17	PEA-066	Rubber sheet assembly
	18	PSG-047	Push switch
	19	PBK-059	R clip
	20	PXB-332	Arm rest assembly
	21	PXV-068	EV sheet unit
	22	PBH-355	EV spring
	23	PBH-292	AS action spring
	24	PXA1139	PU plate assembly
	25	PBF-020	Washer
	26	BPZ26P120FZK	Screw (2.6 × 12)
	27	PBH1080	S/S rod
	28	PBH-368	S/S rod spring
	29	PNC-311	EV lever (A)
	30	PNC-312	EV lever (B)
	31	PNY-130	EV lever (C)
	32	PBH-375	EV lever spring
	33	PSG-048	Push switch
	34	PLB-210	EV lever shaft
	35	TMZ30P120FMC	Screw (3 × 12)
	36	YU30FUC	Nut
	37	IPC30P100FMC	Screw (3 × 10)
	38	.....	.....
	39	PXB-333	PU cord assembly
⚠	40	PDF1072	Power cord assembly
	41	PEB-250	Damper rubber
⚠	42	PTX-070	Power transformer assembly
	43	PBA-144	Clamp screw
	44	PSZ30PO60FMC	Screw (3 × 6)
	45	PPZ30PO80FMC	Screw (3 × 8)
	46	PSG-050	Push switch
	47	PEB-251	Insulater
	48	.....	
	49	PNV1003	Dust cover
	50	PXB-321	Hinge assembly
	51	PEC1002	45 adaptor
	52	PXM-141	Motor assembly
	53	PDE-308	Connector assembly
	54	PDZ30P060FMC	Screw
	55	PBH-200	EV cam spring
	56	PBK-069	AS spring washer
	57	PBA-172	Screw (3 × 27)
	101		Lead wire assembly
	102		Under base
	103		Sub panel assembly
	104		Rubber guard
	105		Rubber sheet
	106		PU plate spring
	107		PU spring
	108		Washer
	109		Washer
	110		Screw
	111		Rubber foot
	112		Cord stopper
	113		Name plate
	114		SW P.C.board assembly
	115		Repeat angle
	116		AS plate
	117		Repeat lever
	118		Repeat locker unit

Exterior



3.2 MECHANISM SECTION (SUB-PANEL ASSEMBLY)



NOTES:

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*

Parts List of Mechanism Section (Sub−Panel Assembly)

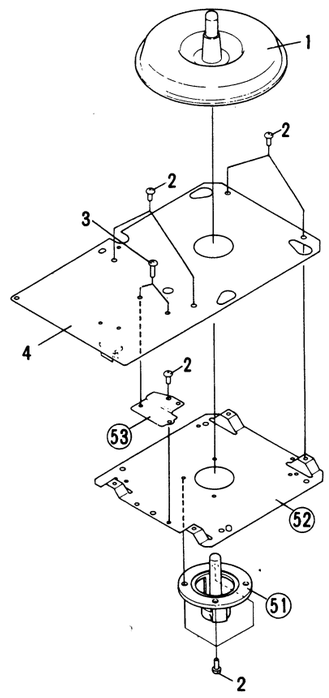
Mark	No.	Parts No.	Description
	1	PNY−028	Reset plate
	2	PNY−140	Selector
	3	PBH−394	Reset plate spring
	4	PNX−030	Switch lever
	5	PNY−141	Switch locker
	6	PXT−446	Detector lever unit
	7	PNY−138	Index cam
	8	PBK−039	Spring washer
	9	PXV−060	Select lever unit
	10	PBH−393	Select lever spring
	11	PYY−164	Cam assembly
	12	PNY−139	Lock plate
	13	PBH−392	Lock plate spring
	14	PBH−018	Polyslider washer
	15	PBA−172	Screw (3×27)
	16	PXB−376	Drive board assembly
	17	PBH−224	Start board spring
	18	PBK−038	Click spring
	19	PMZ26P100FMC	Screw (2.6×10)
	20	PXV−036	Start lever unit
	21	PNY−054	Stay
	22	PNY−055	Hook guide
	23	PBH−357	Hook guide spring
	24	PNY−056	Click lever
⚠	25	PXV−044	Roller unit
	26	PBH−358	Click lever spring
	27	PNY−058	Timing lever
	28	PED−027	Cushion
	29	IPZ30P100FMC	Screw (3×10)
⚠	30	PSF−023	Microswitch (POWER)
	51		Sub−panel unit

3.3 MOTOR ASSEMBLY (PXM-141)

Parts List of Motor Assembly

Mark	No.	Parts No.	Description
	1	PXV−107	Rotor unit
	2	PSZ30P050FMC	Screw (3×5)
	3	PBZ30P100FMC	Screw (3×10)
	4	PWM−197	Motor P.C.board assembly
	51		Spindle base unit
	52		Base
	53		Heat sink

Motor Assembly

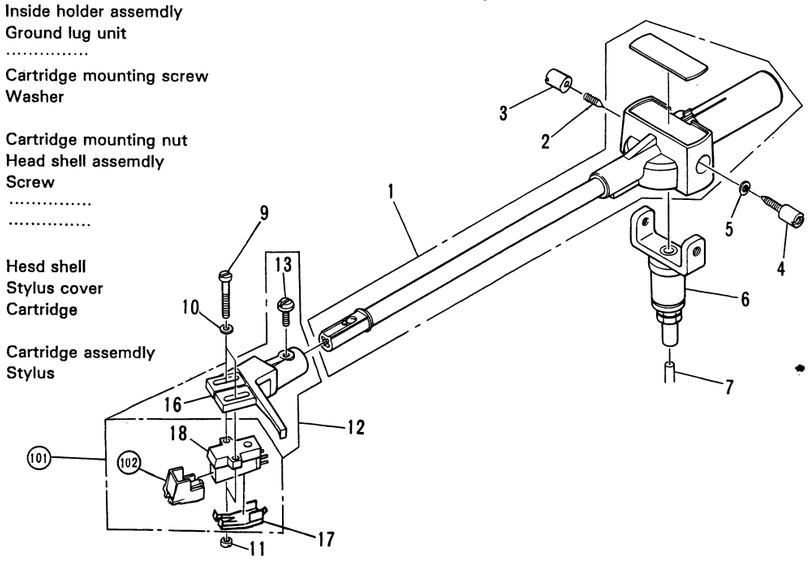


3.4 ARM ASSEMBLY (PPD1024)

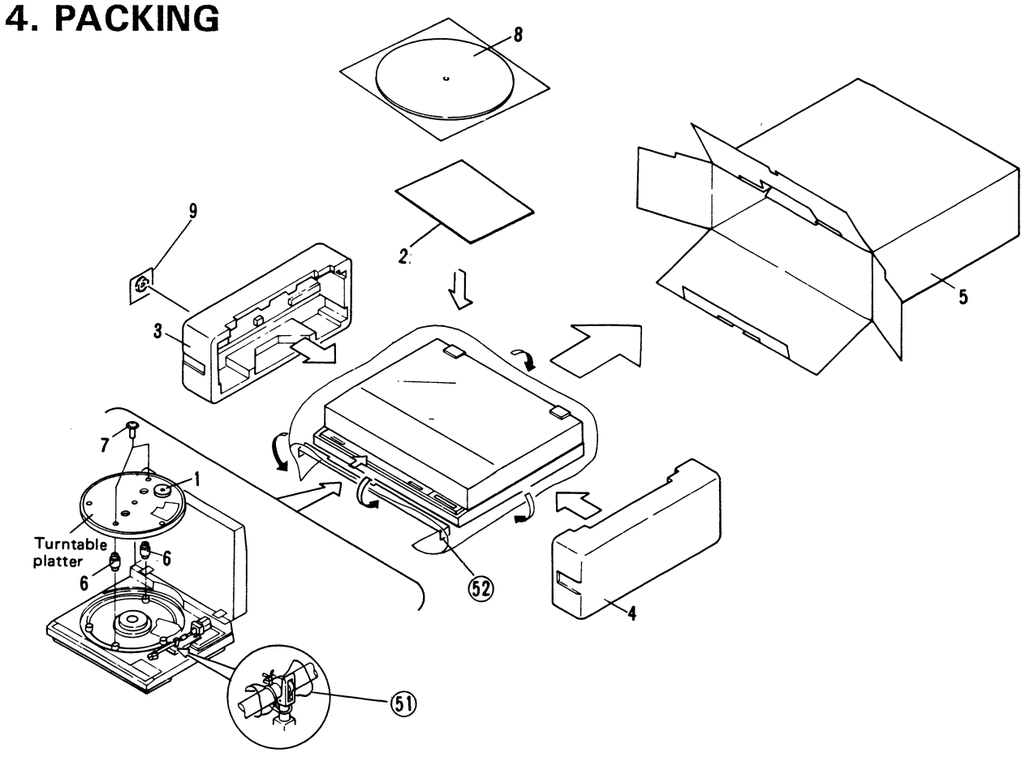
Parts List of Tonearm Section

Mark	No.	Parts No.	Description
	1	PXB1056	Pipe holder assemdly
	2	PLB-654	Pivot
	3	PLB-655	Pivot lock nut
	4	PLB-653	Pivot screw
	5	WS30FMC	Washer
	6	PXB-560	Inside holder assemdly
	7	PDF-514	Ground lug unit
	8	.....	.....
	9	PBA1036	Cartridge mounting screw
	10	PBF1005	Washer
	11	PBN1003	Cartridge mounting nut
	12	PXB1055	Head shell assemdly
	13	PBA-553	Screw
	14	.....	.....
	15	.....	.....
	16	PNW-752	Hesd shell
	17	PNW1510	Stylus cover
	18	PXV1009	Cartridge
	101		Cartridge assemdly
	102		Stylus

Tone Arm Assembly



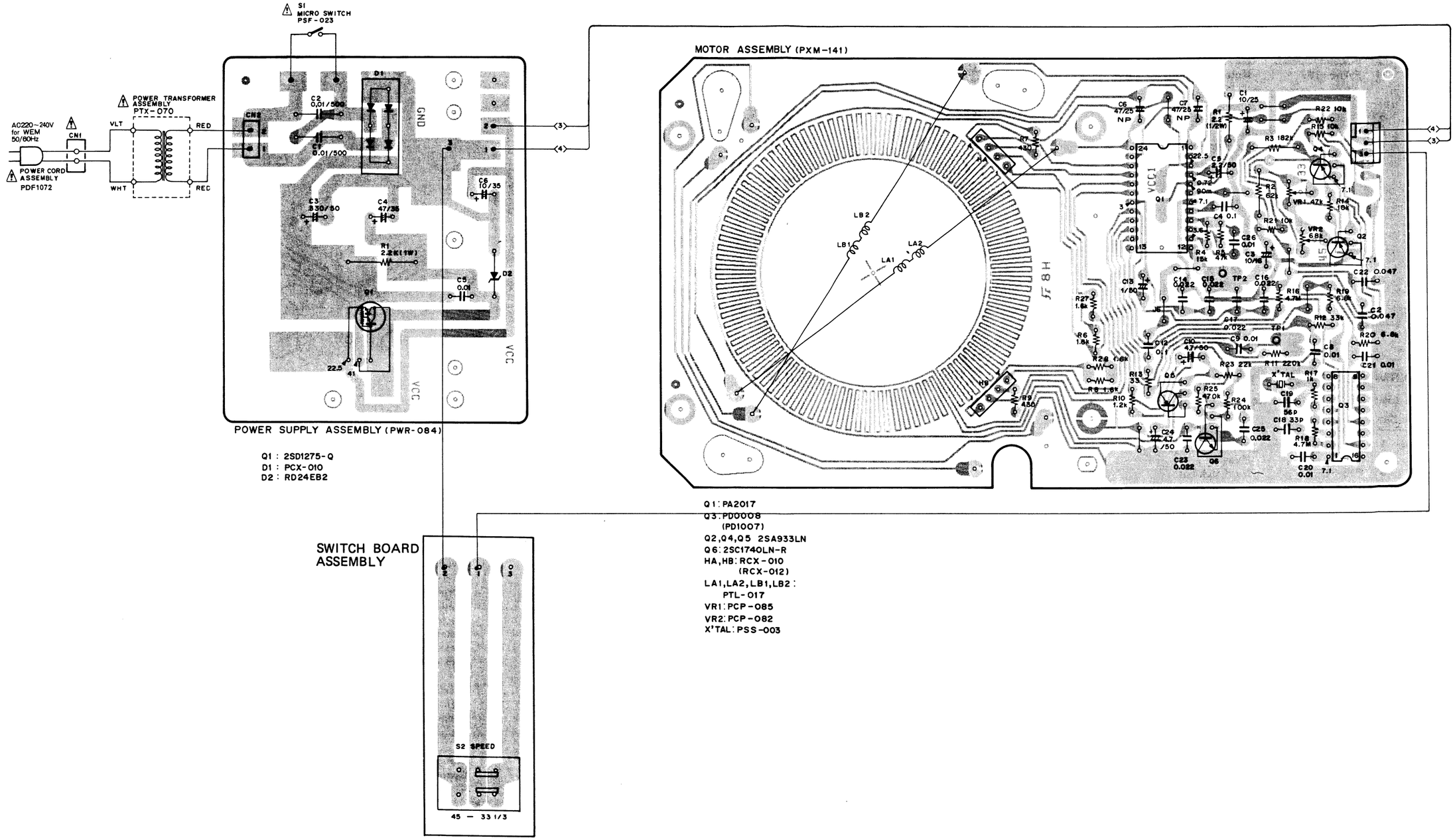
4. PACKING



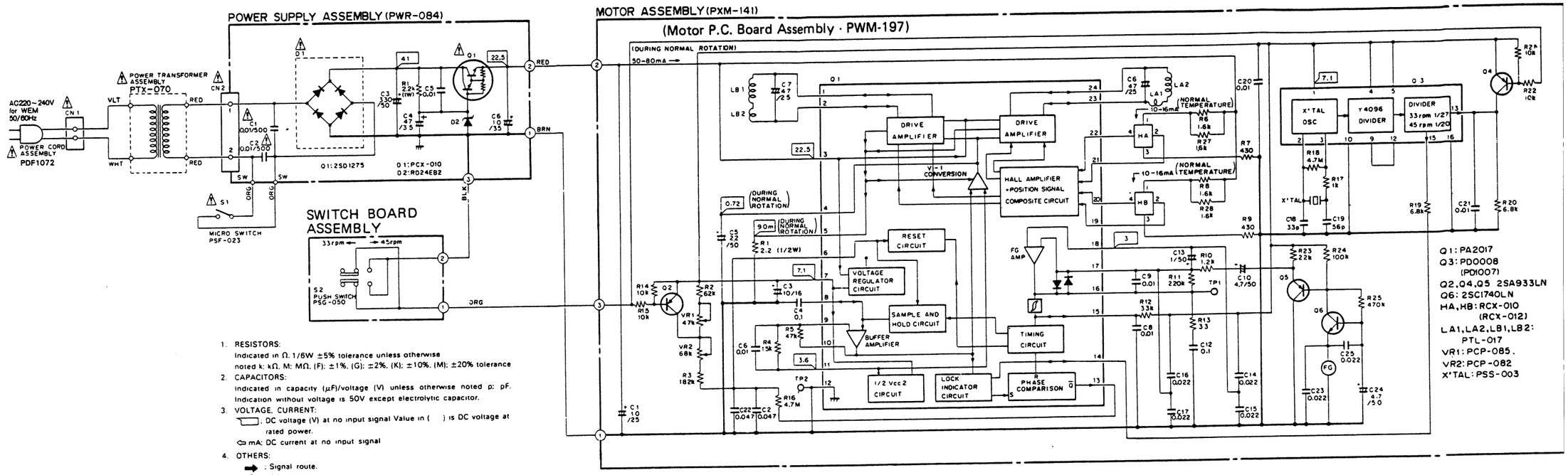
Parts List of Packing

Mark	No.	Parts No.	Description
	1	PEC1002	45 adaptor
	2	PRE1074	Operating instructions (English, German, French, Italian, Dutch, Swedish, Spanish, Portuguese) (PL-445 only)
		PRC1017	Operating instruction (German) (PL-445-S only)
	3	PHA1093	Protector (L)
	4	PHA1094	Protector (R)
	5	PHG1288	Packing case (BLACK)
		PHG1289	Packing case (SILVER)
	6	PNY-198	Packing
	7	PBA-178	Screw
	8	PEA-066	Rubber sheet assemdly
	9	PXA1203	Weight assemdly
	51		Mirror mat
	52		Cpacer

5. P.C.BOARDS CONNECTION DIAGRAM



6. SCHEMATIC DIAGRAM



1. RESISTORS:
   Indicated in Ω. 1/6W ±5% tolerance unless otherwise noted k: kΩ. M: MΩ. (F): ±1%. (G): ±2%. (K): ±10%. (M): ±20% tolerance
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p: pF. Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE, CURRENT:
   ▭: DC voltage (V) at no input signal Value in ( ) is DC voltage at rated power.
   ⇦ mA: DC current at no input signal
4. OTHERS:
   ➡: Signal route.
   ⊘: Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ※ marked capacitors and resistors have parts unmbers.
   The underlined indicates the switch position.

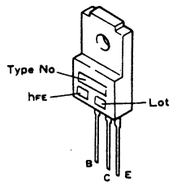
   This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

5. SWITCHES:
   S1 : POWER ON – OFF
   S2 : SPEED 33 1/3rpm – 45rpm

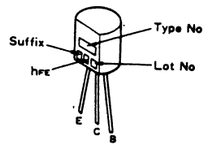
   THE UNDERLINED INDICATES THE SWITCH POSITION

External Appearance of Transistor and ICs

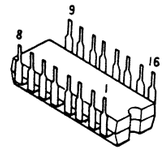
2SD1275



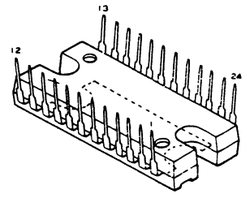
2SA933LN
2SC1740LN
2SA933S



PD0008
PD1007



PA2017



7. ELECTRICAL PARTS LIST

NOTES:

- *Parts without part number cannot be supplied.*
- *Parts marked by "◉" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω	*56 × 10¹*	*561*	*RD1/4PS 5 6 1 J*
47kΩ	*47 × 10³*	*473*	*RD1/4PS 4 7 3 J*
0.5Ω	*0R5*		*RN2H 0 R 5 K*
1Ω	*010*		*RS1P 0 1 0 K*

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN1/4SR 5 6 2 1 F*

Miscellaneouts parts

P.C.BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Power supply assembly	PWR-084
	Switch board assembly	No supply
	Motor P.C.board assembly	PWM-197

OTHERS

Mark	Symbol & Description	Part No.
	Motor assembly	PXM-141
⚠	S1 Microswitch (POWER)	PSF-023
⚠	Power transformer assembly	PTX-070
⚠	Power cord assembly	PDF1072
	PU cord assembly	PXB-333

Power Supply Assembly (PWR-084)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
⚠	Q1	2SD1275
⚠	D1	PCX-010
	D2	RD24EB2 (RD24EB1)

CAPACITORS

Mark	Symbol & Description	Part No.
	C3	CEA331M50L
	C4	CEA470M35
	C6	CEA100M35
⚠	C1 (0.01/500V)	CKDYE103P500
⚠	C2 (0.01/500V)	CKDYE103P500
	C5	CKDYF103Z50

RESISTORS

Mark	Symbol & Description	Part No.
	R1	RS1PMF222J

OTHERS

Mark	Symbol & Description	Part No.
	Screw (3 × 6)	PZZ30P060FMC

Motor P.C.Board assembly (PWM-197)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
	Q1	PA2017
	Q3	PD0008 (PD1007)
	Q6	2SC1740LN
	Q2,Q4,Q5	2SA933LN (2SA933S)

CAPACITORS

Mark	Symbol & Description	Part No.
	C2	CQPA473J50
	C8,C9	CQMA103K50
	C4,C12	CKDYX104M25 (PCL-046)
	C22	PCL-052
	C18	CCDCH330J50
	C19	CCDCH560J50
	C20,C21,C26	CKDYF103Z50
	C14-C17,C23,C25	CKDYF223Z50
	C1	CEA100M50
	C6,C7	CEANP470M25
	C3	CEA100M16
	C13	CEA010M50
	C5	CEA2R2M50
	C10,C24	CEA4R7M50

RESISTORS

NOTE:
When ordering resistors, convert the resistance value into code from, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	VR1 Semi-fixed 47k(B) (33rpm)	PCP-085
	VR2 Semi-fixed 68k(B) (45rpm)	PCP-082
	R1	RD1/2PM2R2J
	R2,R3	RN1/4PQ□□□F
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	X'tal	PSS-003
	HA,HB Hall element	PCX-010 (RCX-012)
	Screw (3 × 5)	PSZ30P050FMC
	Screw (3 × 10)	PBZ30P100FMC
	LA1,LA2,LB1,LB2 Coil	PTL-017

Switch Board Assembly

SWITCH

Mark	Symbol & Description	Part No.
	Switch (SPEED)	PSG-050

8. ADJUSTMENTS

8.1 MOTOR OPERATION ADJUSTMENT

1. Remove the underbase.
2. Connect the Ach of a dual trace oscilloscope to the circuit board unit, Q3 (PD0008) pin 15, and GND. Adjust the time axis so that 1 period of the output waveform is equal to 8 divisions in the 33 rpm mode. Fig. 8−2 (a).
3. Connect the Bch of a dual trace oscilloscope to Q1 (PA2017) pin 15, and GND. Adjust VR2 (45 rpm) so that the relation between the Ach and Bch waveforms in the 45 rpm mode is as shown in Fig. 8−2 (b).
4. Set the turntable to 33 rpm and adjust VR1 (33 rpm) until the relation between the Ach and Bch waveforms are as shown in Fig. 8−2 (c).
5. Always make motor operation adjustments starting with 45 rpm and ending with 33 rpm.

8.2 MECHANISM ADJUSTMENT

- **Stylus Landing Position Adjustment**

When the tone arm doesn't land in the correct position during automatic playback, adjust according to the following procedure.

1. Place a 30 cm record on the platter.
2. Press the PLAY/STOP button and start automatic playback. Note the direction and amountif the landing point is off. (How many mm to the inside or outside from the record grooves.)
3. Depress the PLAY/STOP button to return the tone arm to its rest.
4. Press the ARM-ELEVATION control to raise the stylus.
5. Move the tone arm to the outside edge of the record by hand.
6. Turn the adjustment screw with a small screwdriver according to the direction and amount checked at item 2 as follows:
   - When the stylus lands at the outside of the record, turn the adjustment screw in the ↻ direction.
   - When the stylus lands at the inside of the record, turn the adjustment screw in the ↺ direction.

   One half turn of the adjustment screws moves the tone arm about 12 mm.
7. After adjustment, press the PLAY/STOP button and check if the stylus landing point was correctly adjusted.

   If adjustment is incorrect, repeat items 3 to 6.

Be careful not to damage the record and stylus when making this adjustment.

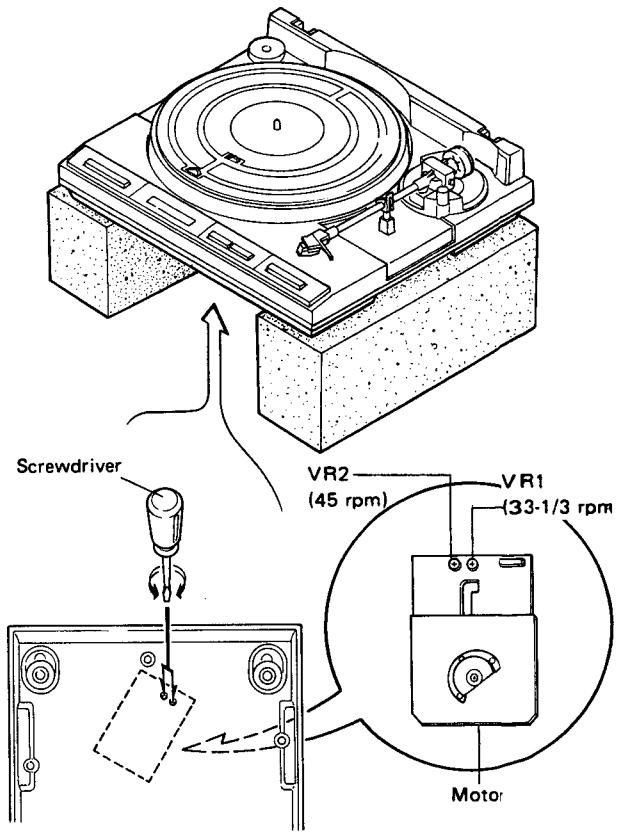


Fig. 8-1 Motor adjustment

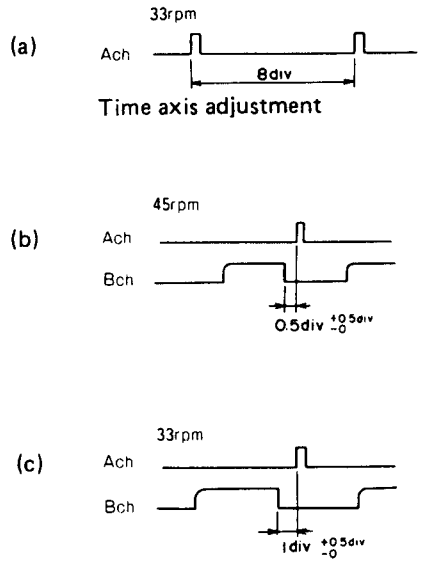


Fig. 8-2 Motor Operation Adjustment Waveforms

Adjustment using a test record

(Lowering position adjustment is made with the tone arm on the outside edge of the record.)

30 cm landing point . . . Lands between count 306 and 313.

17 cm landing point . . . Lands between count 175 and 183.

- **Auto-Return Position Adjustment**

When auto-return occurs too early or too late, make the following adjustments.

1. Check the stylus landing position. If the stylus does not land at the correct position, adjust the landing position.
2. Set the ARM-ELEVATION control to UP and turn the auto-return adjustment screw fully counter-clockwise.
3. Move the tone arm as far as it will go toward the inside.
4. When the auto-return adjustment screws is turned slowly clockwise, the tone arm will begin to move toward the inside.
5. Stop turning the adjustment screw at the point at which there is a space of 32 mm between the cartridge stylus and the center shaft. (Fig. 8−3)
6. After adjustment, check is auto-return is performed correctly and that the stylus landing position is correct.

- **Arm Elevation Height Adjustment**

1. Press the ARM-ELEVATION control to raise the stylus.
2. Loosen the height control screw.
3. Turn the height adjustment screw to set the stylus 30.5 mm over the cabinet (Fig. 8−3).
4. Tighten the height control screw to set the stylus 25 mm over the cabinet.

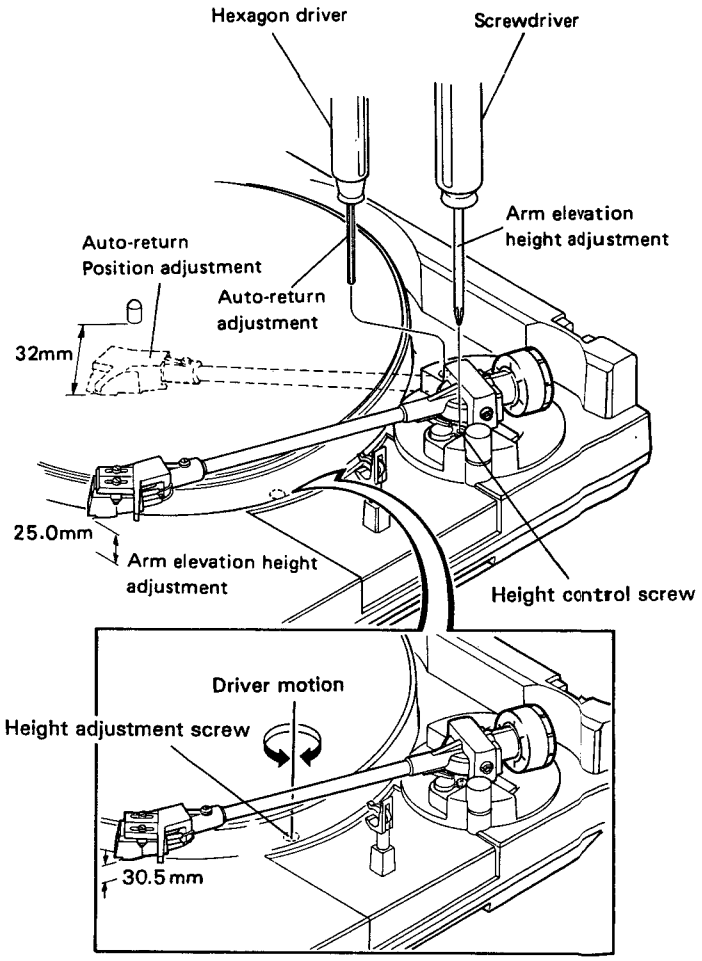


Fig. 8-3 Arm elevation height adjustment and auto-return adjustment

8. RÉGLAGE

8.1 RÉGLAGE DU FONCTIONNEMENT DU MOTEUR

1. Déposer la base inférieure.
2. Connecter le Ach de l'oscilloscope à deux traces, au bloc de la plaquette de circuit, à la broche No. 15 de Q3 (PD0008), et GND. Régler l'axe de temps de telle maniére quúne période de la forme d'onde de sortie soit égale à 8 divisions en mode de 33 tours/minute. Fig. 8−2(a).
3. Connecter le Bch de l'oscilloscope à deux traces à la broche No. 15 de Q1 (PA2017), et GND. Régler VR2 (45 tours/minute) de telle manière que le rapport entre les formes d'onde Ach et Bch en mode de 45 tours/minute soit celui indiqué par la Fig. 8−2(b).
4. Régler le plateau sur 33 tours/minute et régler VR1 (33 tours/minute) jusqu'à ce que le rapport entre les formes d'onde de Ach et Bch soit celui indiqué par la Fig. 8−2 (c).
5. Toujours effectuer les réglages de fonctionnement du moteur en commençant avec le mode de 45 tours/minute et en terminant avec celui 33 tours/minute.

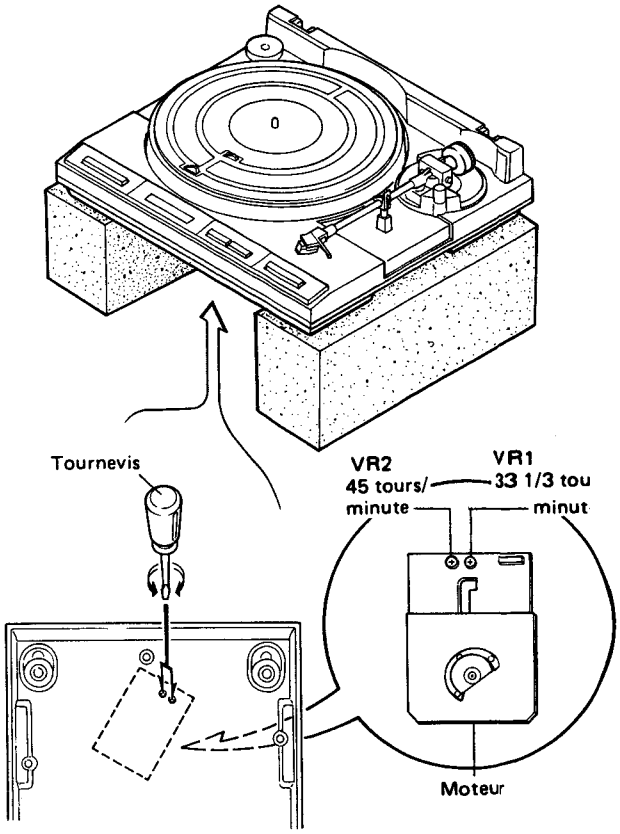


Fig. 8 -1 Réglage du moteur

8.2 RÉGLAGE DU MÉCANISME

● Réglage de la position de descente de la pointe de lecture

Lorsque le bras de lecture ne descend pas sur la position correcte lors de la lecture automatique, réaliser le réglage en suivant la procédure suivante.

1. Placer un disque de 30cm sur le plateau.
2. Appuyer sur la touche de lecture/arrêt (PLAY/STOP) et faire débuter la lecture automatique. Noter la direction et la grandeur de l'écart du point de descente. (Nombre de mm vers l'intérieur ou vers l'extérieur du sillon.)
3. Appuyer sur la touche PLAY/STOP pour faire retourner le bras de lecture sur son support.
4. Appuyer sur la touche de relevage du bras ARM-ELEVATION pour soulever la pointe de lecture.
5. Déplacer à la main le bras de lecture vers la périphérie du disque.
6. Tourner la vis de réglage à l'aide d'un petit tournevis, en fonction de la direction et de la quantité mesurées lors du point 2, comme suit:

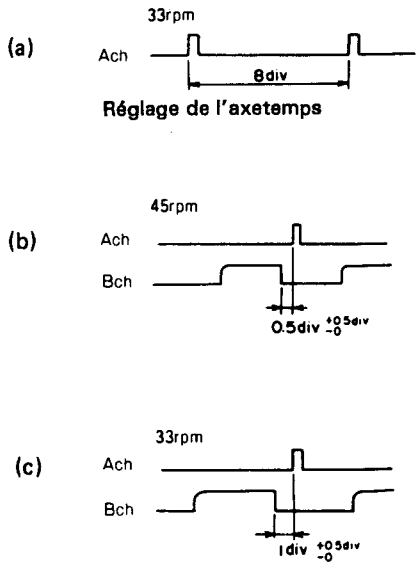


Fig. 8-2 Formes d'onde de réglage du fonctionnement du moteur

- Lorsque la pointe de lecture descend vers l'extérieur du disque, tourner la vis de réglage dans le sens ↻
- Lorsque la pointe de lecture descend vers l'intérieur du disque, tourner la vis de réglage dans le sens ↺
  Un demi-tour de la vis de réglage correspond à un déplacement d'environ 12mm du bras de lecture.

7. Après le réglage, appuyer sur la touche PLAY / STOP et vérifier si le réglage de la position de descente a été correctement effectué.
   Si le réglage n'est pas correct, répéter les étapes 3 à 6.

Prendre soin de ne pas endommager le disque ni la pointe de lecture en réalisant ce réglage.

Réglage au moyen d'un disque d'essai

(Le réglage de la position d'abaissement est réalisé avec le bras de lecture placé sur la périphérie du disque.

Point de descente
pour 30cm ..... Descente entre les valeurs 306 et 313.

Point de descente
pour 17cm ..... Descente entre les valeurs 175 et 183.

- **Réglage de la position de retour automatique**

Réaliser les réglages suivants lorsque le retour automatique se produit tôt ou trop tard.

1. **Contrôler la position de descente de la pointe de lecture. Si la pointe de lecture ne descend pas sur la position correcte, ajuster la position de descente.**
2. Régler la touche de relevage du bras ARM-ELEATION sur la position "UP" et tourner la vis de réglage du retour automatique à fond dans le sens contraire des aiguilles d'une montre.
3. **Déplacer le bras de lecture le plus possible vers l'intérieur.**
4. **Lorsque la vis de réglage du retour automatique est tournée lentement dans le sens des aiguilles d'une montre, le bras de lecture commence à se déplacer vers l'intérieur.**
5. **Arrêter de tourner la vis de réglage sur le point pour lequel il y a un écart de 32mm entre la pointe de lecture et l'axe central.** (Fig. 8—3)
6. **Après le réglage, vérifier que le retour automatique se réalise correctement et que la position de descente de la pointe est correcte.**

- **Réglage de la Hauteur D'élévation du Bras Acoustique**

1. Appuyer sur la commande de soulèvement du bras (ARM ELEVATION) pour soulever la pointe de lecture.
2. Desserrer la vis de contrôle de la hauteur.
3. Tourner la vis de réglage de hauteur pour régler la pointe á 30.5 mm au-dessus du coffret (Fig. 8—3).
4. Serrer la vis de contrôle de la hauteur pour régler la pointe à 25 mm au-dessus du coffret.

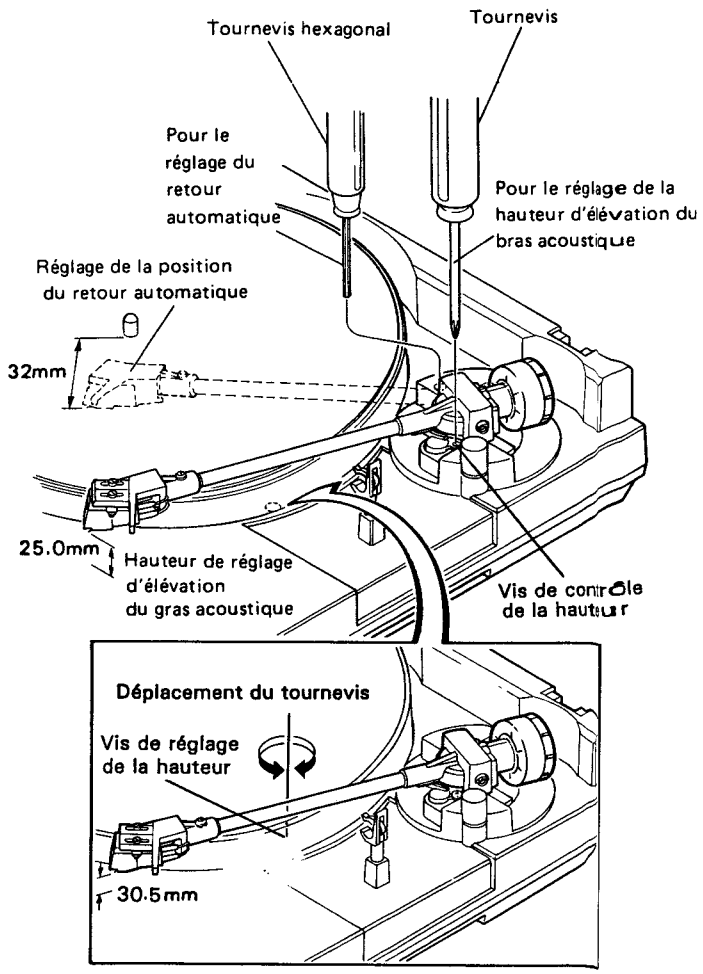

Tournevis hexagonal
Tournevis
Pour le réglage du retour automatique
Pour le réglage de la hauteur d'élévation du bras acoustique
Réglage de la position du retour automatique
32mm
25.0mm
Hauteur de réglage d'élévation du gras acoustique
Vis de contrôle de la hauteur
Déplacement du tournevis
Vis de réglage de la hauteur
30.5mm

Fig. 8-3 Réglages de la hauteur d'élévation du bras acoustique et du retour automatique

8. AJUSTE

8.1 AJUSTE DE LA OPERACIÓN DEL MOTOR

1. Sacar la sub-base.
2. Conectar el Ach del osciloscopio de trazas dobles a la unidad de tablero de circuito, al pasador No. 15 de Q3 (PD0008) y GND. Ajustar el eje de tiempo, de manera que la forma de onda de salida sea igual a 8 divisiones en el modo de 33 rpm. Figura 8−2(a).
3. Conectar el Bch del osciloscopio de trazas dobles a Q1 (PA2017) pasador No. 15, y GND. Ajustar el VR2 (45 rpm) de manera que la relación entre las formas de onda de Ach y Bch en el modo de 45 rpm sea como se muestra en la Figura 8−2(b).
4. Fijar el disco giratorio a 33 rpm y ajustar el VR1 (33 rpm) hasta que la relación entre las formas de onda Ach y Bch sea como se muestra en la Figura 8−2(c).
5. Siempre efectúe los ajustes de la operación del motor comenzando por 45 rpm y terminando con 33 rpm.

8.2 AJUSTE DE LA POSICIÓN DE DESCENSO DE LA AGUJA

Cuando el brazo fonocaptor no desciende en la posición correcta durante la reproducción automática, ajustar de acuerdo con el procedimiento siguiente.

1. Poner un disco de 30cm sobre el plato.
2. Presionar el botón de inicio/reproducción (PLAY/STOP) e iniciar la reproducción automática. Notar la dirección y cantidad si el punto de descenso es incorrecto. (Cuántos mm hacia el interior o exterior de los surcos del disco.)
3. Presionar el boton de inicio/reproducción (PLAY/STOP) para hacer volver el brazo fonocaptor a su posición de apoyo.
4. Presionar el control de elevatión del brazo ARM ELEVATION para hacer ascender la aguja.
5. Desplazar el brazo fonocaptor hacia el borde exterior del disco con la mano.
6. Girar el tornillo de ajuste con un destornillador pequeño de acuerdo con la dirección y cantidad comprobadas en el item 2 del modo siguiente:
   - Cuando la aguja desciende fuera del disco, girar el tornillo de ajuste en la dirección
   - Cuando la aguja desciende en el interior del disco, girar el tornillo de ajuste en la dirección

   Media vuelta de los tornillos de ajuste desplaza el brazo fonocaptor unos 10mm.

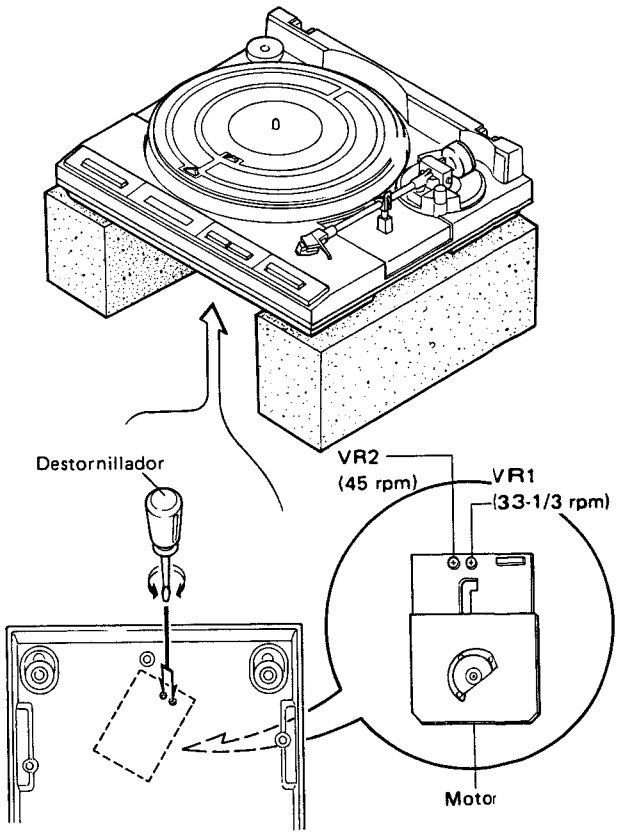
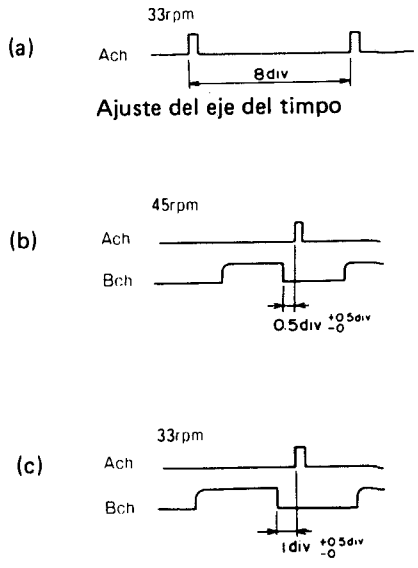


Figura 8-1 Ajuste del motor.



Ajuste del eje del timpo

Figura 8-2 Formas de onda de ajuste de la operación del motor

7. Después del ajuste, presionar el boton de reproducción/parada (PLAY/STOP) y comprobar si el punto de descenso de la aguja se ha ajustado correctamente.
   Si el ajuste es incorrecto, repetir los items 3 al 6.

Tener cuidado de no dañar el disco ni la aguja al efectuar este ajuste.

Ajuste empleando un disco de prueba

(El ajuste de la posición de descenso se efectúa con el brazo fonocaptor sobre su borde exterior del disco.)

Punto de descenso
para 30cm . . . . . Desciende entre el cómputo 306 y 313.

Punto de descenso
para 17cm . . . . . Desciende entre el cómputo 175 y 183.

- **Ajuste de la posición de retorno automático**

Cuando el retorno automático se produce demasiado rápido o demasiado tarde, efectuar los ajustes siguientes.

1. Comprobar la posición de descenso de la aguja. Si la aguja no desciende en la posición correcta, ajustar la posición de descenso.
2. Ajustar el control de elevatión del brazo ARM ELEVATION en la posición UP y girar el tornillo de ajuste de retorno automático completamente hacia la izquierda.
3. Desplazar el brazo fonocaptor hacia el interior al máximo.
4. Cuando se giran lentamente los tornillos de ajuste de retorno automático hacia la derecha, el brazo fonocaptor emplezará a moverse hacia el interior.
5. Dejar de girar el tornillo de ajuste en el punto en el que haya un espacio de 32mm entre la aguja de la cápsula y el eje central. (Figura 8−3)
6. Después del ajuste, compronar que la operación de retorno automático se efectúe correctamente y que la posición de descenso de la aguja sea la correcta.

- **Ajuste de la Altura de Elevación del Brazo Sonoro**

1. Presione el control ARM ELEVATION para que ascienda la aguja.
2. Afloje el tornillo de control de la altura.
3. Gire el tornillo de ajuste de la altura para ajustar la aguja a 30,5 mm sobre la caja (Fig. 8−3).
4. Apriete el tornillo de control de la altura para ajustar la aguja a 25 mm sobre la caja.

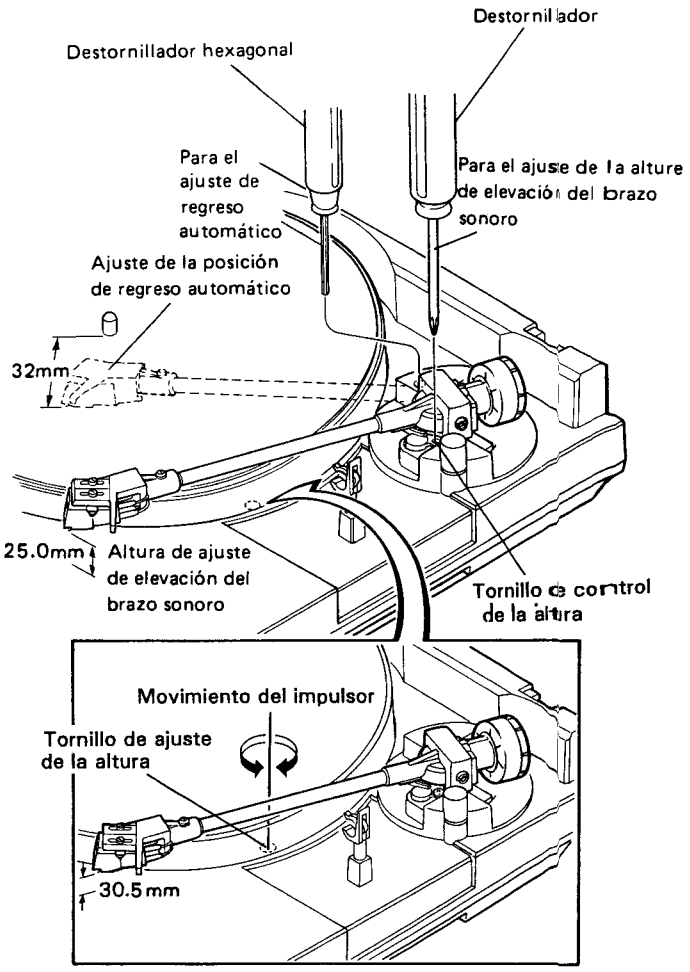

Destornillador
Destornillador hexagonal
Para el ajuste de regreso automático
Para el ajuste de la alture de elevación del brazo sonoro
Ajuste de la posición de regreso automático
32mm
25.0mm
Altura de ajuste de elevación del brazo sonoro
Tornillo de control de la altura
Movimiento del impulsor
Tornillo de ajuste de la altura
30.5mm

Figura 8-3 Ajustes de la altura de elevación del brazo sonoro y de regreso automático;